

CLAIMS:

Sub B1 1. A substantially solid biomolecular solder comprising biomolecules which are denatured so that in use, the solubility of the solder is reduced.

5 2. A solder according to claim 1 wherein the biomolecule is a protein.

3. A solder according to claim 2 wherein the protein is any one or more of albumin, elastin, collagen and fibrinogen.

10 4. A solder according to any one of the preceding claims, further comprising a dye for improving energy deposition into the solder when the solder is exposed to energy.

15 5. A solder according to claim 4 wherein the dye is indocyanine green, methylene blue or fluorescent isothiocyanate.

6. A solder according to any one of the preceding claims, further comprising an adjuvant for promoting rapid or more complete tissue healing.

20 7. A solder according to claim 6 wherein the adjuvant is a growth factor, sodium hyaluronate, a hormone or an anti-coagulant.

8. A solder according to any one of the preceding claims, further comprising a material for improving the strength of the solder.

25 9. A solder according to claim 8 wherein the material is a polytetrafluoroethylene fibre or a ceramic fibre.

10. A kit comprising a solder according to any one of the preceding claims.

30 11. A method of preparing a biomolecular solder, the method comprising the following steps:
(a) forming a substantially solid composition comprising biomolecules and a solvent;
(b) denaturing the biomolecules in the composition; and

(c) drying the composition to form the solder;
wherein in step (b), the biomolecules are denatured so
that in use, the solubility of the solder is reduced.

Sub A4 *Sub B5* 12. A method according to claim 11 wherein in step
5 (b) the biomolecules are denatured by exposing the
composition to energy for a time period which is
sufficient to allow the energy to denature the
biomolecules.

13. A method according to claim 12 wherein the
10 energy is thermal energy.

Sub B6 14. A method according to claim 13 wherein the
biomolecules are denatured by heating the composition at a
temperature of greater than 40°C for a time period of about
30 seconds or longer.

15. A method according to claim 14 wherein the
composition is heated in a hot liquid bath or in
pressurised steam.

Sub B7 16. A method according to claim 11 wherein in step
20 (b), the biomolecules are denatured by exposing the
composition to a compound for a time period which is
sufficient to allow the compound to denature the
biomolecules.

17. A method according to claim 11 wherein in step
25 (a), the substantially solid composition is formed by
mixing the biomolecules with a solvent in amounts which
are sufficient to allow the substantially solid
composition to form.

18. A method according to claim 17 wherein the
biomolecules and the solvent are mixed in amounts of
30 80%w/w and 20%w/w respectively.

19. A method according to claim 11 wherein in step
(a), a dye for improving energy deposition into the solder
is added to the substantially solid composition.

Sub B8 20. A method according to claim 19 wherein the dye
35 is added to the composition in an amount between 0.1 to
2.5% w/w.

- 39 -

Sub A7 >

21. A method according to claim 20 wherein the dye is mixed with the solvent, prior to mixing the solvent with the biomolecules.

5 22. A method according to claim 11 wherein in step (c), drying the composition to form the solder removes all of the solvent from the solder.

23. A method according to claim 11 wherein the composition is formed into a shape before the biomolecules in the composition are denatured in step (b).

10 Sub B12 > 24. A method according to claim 23 wherein the composition is applied to a structure before the biomolecules in the composition are denatured in step (b).

25. A method according to claim 24 wherein the structure is a mesh, stiffener or graft material.

15 Sub B14 > 26. A method according to claim 11 further comprising the step of sterilizing the solder.

27. A method of repairing a biological tissue, the method comprising the following steps:

20 (a) applying a solder according to claim 1 to the site of a tissue to be repaired; and

(b) exposing the solder to energy for a time sufficient to allow the solder to bond to the tissue so that the tissue is repaired.

25 28. A method according to claim 27 wherein the solder is moistened before application to the site of the tissue to be repaired.

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Add B6 >